

Daily Math:

Evaluate the expression when $x = 3$, $y = 5$, and $z = -1$.

1. $5x - 6$

2. $\frac{1}{2}y + z$

3. $x + 2(y - z)$

4. $1.5z - x$

Practice B

1. 3 is a solution of the equation.
2. 3 is not a solution of the equation.
3. -1 is a solution of the equation.
4. B 5. D 6. A 7. C
8. B, D, A, C 9. -3 10. 11 11. -7
12. 48 13. 48 14. -40 15. $-1\frac{6}{7}$ 16. 28
17. 2.5 18. $2r + 15 = -17$; -16
19. $3c - 8 = 31$; 13 20. You can buy 5 CDs for \$40.
21. The window is 35 inches long.
22. Kathy worked 45 hours.

Practice C

1. Write original equation. Add 7 to each side. Divide each side by 11. Simplify. Check your answer.
2. Write original equation. Subtract $\frac{3}{8}$ from each side. Multiply each side by -2 . Simplify. Check your answer.
3. -4 4. 7 5. 5 6. -187.5 7. -134.56
8. $50\frac{2}{3}$ 9. $-1\frac{7}{9}$ 10. -18 11. 5 12. -7
13. $-\frac{2}{9}$ 14. $\frac{1}{7}$ 15. $\frac{5}{6}b + 18 = -32$; -60
16. $4t - 9 = 23$; 8 17. You can buy 7 CDs for \$60. 18. The door is 79 inches long.
19. Frank worked 44.5 hours. 20. You would need 91 points on the fourth test. 21. Answers will vary.
22. You should check your answer to make sure that it is reasonable. If it is not reasonable, you know you made an error in your calculations.

Voting You must be at least 18 years old to vote in the United States. This can be represented by the *inequality* $y \geq 18$.

An **inequality** is a mathematical sentence formed by placing an inequality symbol ($<$, $>$, \leq , or \geq) between two expressions. The **solution of an inequality** is the set of numbers that you can substitute for the variable to make the inequality true.

The **graph of an inequality** in one variable is the set of points on a number line that represents the solution of the inequality. An open dot on a graph indicates a number that is *not* part of the solution. A closed dot indicates a number that *is* part of the solution.

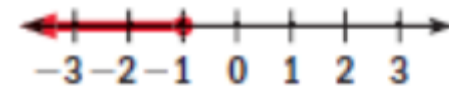
EXAMPLE 1 Graphing Inequalities

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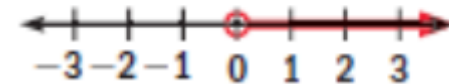
a. $x < 2$ All numbers less than 2



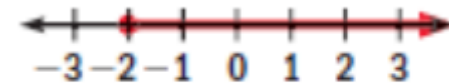
b. $x \leq -1$ All numbers less than or equal to -1



c. $x > 0$ All numbers greater than 0



d. $x \geq 2$ All numbers greater than or equal to 2



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Equivalent inequalities are inequalities that have the same solution.

You can produce an equivalent inequality in the following ways.

- Add or subtract the same number on each side.
- Multiply or divide each side by the same *positive* number.

$$1 < 3$$

Multiply each side by 2.

$$2 < 6$$

- Multiply or divide each side by the same negative number and reverse the direction of the inequality.

$$1 < 3$$

Multiply each side by -2 .

$$-2 > -6$$

EXAMPLE 2 Solving an Inequality

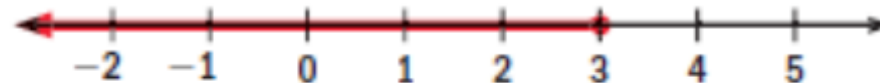
xy Solve $d - 2 \leq 1$. Then graph the solution.

$$d - 2 \leq 1 \quad \text{Write original inequality.}$$

$$d - 2 + 2 \leq 1 + 2 \quad \text{Add 2 to each side.}$$

$$d \leq 3 \quad \text{Simplify.}$$

To graph $d \leq 3$, use a closed dot and draw an arrow pointing to the left.



Check To check the solution $d \leq 3$, choose any number less than or equal to 3 to substitute for d . The check below uses $d = 0$.

$$d - 2 \leq 1 \quad \text{Write original inequality.}$$

$$0 - 2 \stackrel{?}{\leq} 1 \quad \text{Substitute 0 for } d.$$

$$-2 \leq 1 \quad \checkmark \quad \text{Solution checks.}$$

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Solve the inequality. Then graph the solution.

1. $x - 3 \geq -1$

2. $6 < t - 5$

3. $w + 9 < -4$

4. $1 \leq k + 7$

EXAMPLE 3 Solving an Inequality

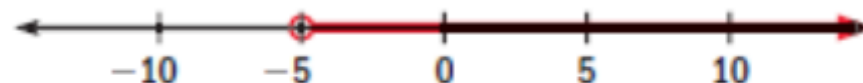
xy Solve $-4w < 20$. Then graph the solution.

$$-4w < 20 \quad \text{Write original inequality.}$$

$$\frac{-4w}{-4} > \frac{20}{-4} \quad \text{Divide each side by } -4. \text{ Reverse inequality.}$$

$$w > -5 \quad \text{Simplify.}$$

To graph $w > -5$, use an open dot and draw an arrow pointing to the right.



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Solve the inequality. Then graph the solution.

5. $-3n \geq -24$

6. $6s < -42$

7. $-\frac{1}{2}x \leq 5$

8. $\frac{3}{4}r > 12$

Homework:

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